

## **In-Depth Case Analysis for Iullemeden Aquifer System<sup>1</sup>**

This case study is one of a series that has been prepared as part of the Global Environment Facility (GEF) Good Practices and Portfolio Learning in GEF Transboundary Freshwater and Marine Legal and Institutional Frameworks Project International Waters Governance project. The objective of these case studies is to provide insight into how these agreements were negotiated and how well they are working. Each case study has been peer reviewed by one or more experts with direct knowledge of the agreement being analyzed.

### **1 Background of the Agreement**

The Iullemeden Aquifer System (IAS) is situated in the arid and semi arid zone of West Africa. It expands between the latitudes 10°30 and 22° N and the longitudes 0°50 and 9°20 E, and covers 500.000 km<sup>2</sup>. As a whole the IAS includes Algeria, Benin, Burkina Faso, Mali, Niger, and Nigeria, but according to the concerned aquifers (Continental intercalaire and Continental terminal) it is principally shared among Mali, Niger and Nigeria, in the approximate percentages of 6%, 82% and 12%, respectively.

Figure 1 shows that the system is characterized by two major aquifers: the Continental Intercalaire (CI – in green) and the shallower and smaller Continental Terminal (CT - red). The aquifer system receives approximately 150 million m<sup>3</sup>/year modern recharge along its basement fringes in the river valleys, with runoff from the bordering highlands in Mali, Niger and Nigeria. However, estimates of water use currently exceed 200 million m<sup>3</sup>/year,

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<sup>1</sup> This Case Study was prepared by the Good Practices and Portfolio Learning in GEF Transboundary Freshwater and Marine Legal and Institutional Frameworks Project at the Institute for Asian Research, UBC. It has been peer reviewed by Gabriel Ekstein (Director of International Water Law Project (Texas Tech)); Abdul Kader Dodo (Project Manager of the IAS Project (l'Observatoire du Sahara et du Sahel) and Alice Aureli (UNESCO). We are indebted to Glen Hearn and Hilary Norris for their research and writing of this case study.

and aquifer levels have dropped substantially in some areas over the past decades. The basin is home to some 15 million people, with 65 per cent in Niger, 34 per cent in Nigeria and 2 per cent in Mali. This is projected to grow to 28 million by 2025.<sup>2</sup>

A GEF-funded project, “Managing Hydrogeological Risks in the Iullemeden Aquifer System”, was undertaken to examine the relationship between the different parts of the aquifer and the impact of the management of the water resources in different areas. The project revealed that adverse impacts on water resources are expected to be amplified by climate change, which is predicted to reduce precipitation, the runoff, the recharge of the aquifers and increase evaporation losses as well as diminish water availability for vegetation cover in the humid zones. In addition, salinization, water pollution and inter-aquifer leakage threaten water quality (contamination because of the geological formation i.e. fluoride in the Apatite), and have transboundary implications.<sup>3</sup>

The project also demonstrated interchange between surface waters of the Niger River hydrographic network and the Iullemeden Aquifer System, with each feeding the other at various times during the year. The waters of the Niger River are governed by an agreement with 9 basin states (Algeria in now an Observer). This surface water – groundwater interaction is now being explored under a new project funded by the GEF as is expected to yield results in 2012.<sup>4</sup>

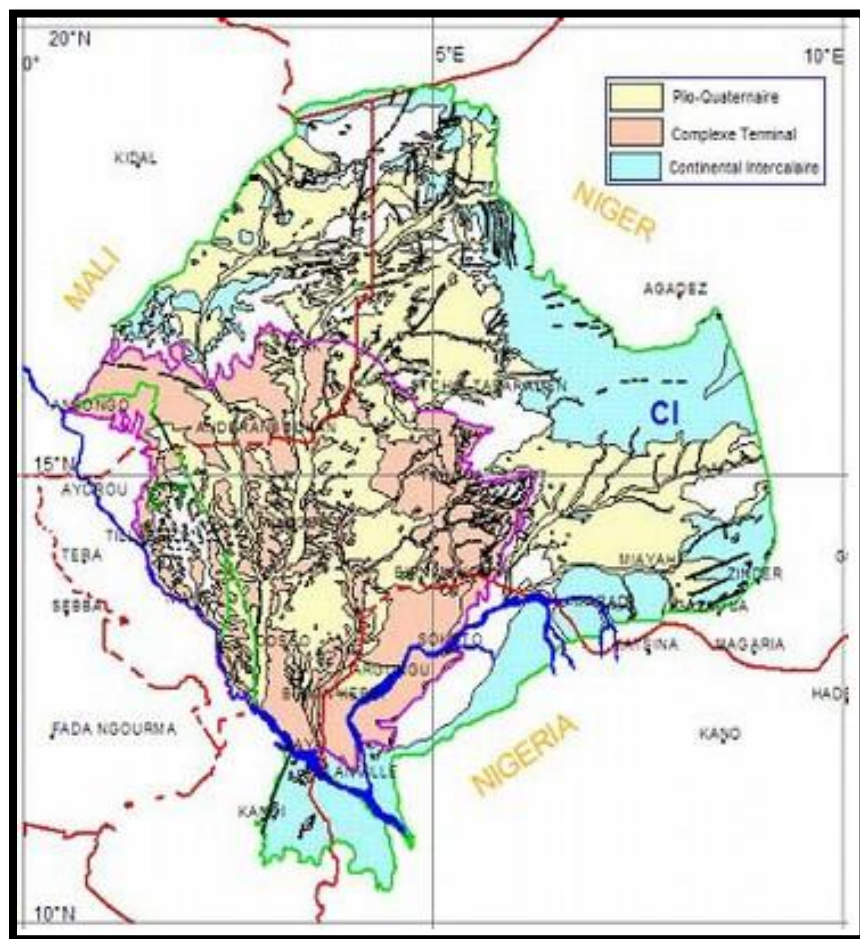
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<sup>2</sup> Hearn, G (2009) Terminal Evaluation of Managing Hydrological Risks in the Iullemeden Aquifer System, UNEP Evaluation and Oversight Unity, January 2009 at 5

<sup>3</sup> Ibid., at 2

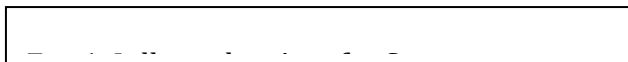
<sup>4</sup> OSS (2009), *Blazing a trail: Mali, Niger and Nigeria establish a tripartite consultation mechanism on the IAS*, l'Observatoire du Sahara et du Sahel, Tunis, available at [http://www.oss-online.org/index.php?option=com\\_content&task=view&id=825&Itemid=643&lang=en](http://www.oss-online.org/index.php?option=com_content&task=view&id=825&Itemid=643&lang=en), accessed 14 August 2010

The Memorandum of Understanding (MoU) relating to the formation of a Consultative Mechanism for the management of the Iullemeden Aquifer System was developed to address management concerns for the IAS.<sup>5</sup> Adopted by the Ministers of the related States in 2009, the MoU will be signed during the launching workshop of the second phase of IAS. The Memorandum outlines a consultation mechanism for information gathering, information exchange and decision making for the sustainable water resource management of the aquifer.



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<sup>5</sup> The Memorandum of Understanding relating to the setting up of a Consultative Mechanism for the management of the Iullemeden Aquifer System (IAS), 20 June 2009



## 2 Negotiation of the Agreement

### 2.1 Context

Changes in land use in the recharge areas over the past 50 years have affected mainly the recharge to the upper aquifer. Expanding agriculture, into marginal low-rainfall areas, and changes in land use in recharge areas (humid zones) pose growing transboundary risks to the environmental integrity of the IAS. Salinization, water pollution and inter-aquifer leakage from human activity risk increasing water degradation. The expected effects of climate change, namely reduced precipitation, the runoff, the recharge of the aquifers and increased evaporation losses, are anticipated to intensify these problems, and will likely lead to declining water levels on the vegetation cover in humid zones.<sup>6</sup>

With the assistance of GEF and UNESCO, the countries of Mali, Niger and Nigeria took part in the “Managing Hydrogeological Risks in the Iullemeden Aquifer System” project to jointly identify and manage the risks associated with sustainable water use of the IAS. This was originally conceived by UNESCO in 2001, and was initiated through GEF with the support of FAO, UNESCO, and UNEP in 2004.<sup>7</sup> Its goal was to establish the capacity to identify risks and uncertainty in groundwater use, develop a mechanism to formulate policy towards sustainable management, and create a legal cooperative framework to manage the aquifer. UNESCO and FAO completed their involvement in 2006, and the GEF

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<sup>6</sup> Hearns,(2009) at 5

<sup>7</sup> Hearns, (2009) at 6

project ended in 2008 with the development of a hydrogeological model, a consultative mechanism (adopted by the countries however, not yet formally signed) for information exchange, and growing awareness and appreciation for the importance of groundwater resources.

The project concluded that:

Aquifer levels have dropped markedly in some areas, particularly in the Continental Terminal aquifer;

There is a complex and dynamic interaction between the surface water regime and ground water regime, with each supplying the other at different locations and in different seasons; and

Over exploitation is likely to exacerbate existing problems.

The goals of the project were to establish joint mechanisms and capacity to identify risk and uncertainty in the aquifers, formulate policy to address them, and establish a legal framework for their implementation.<sup>8</sup>

The countries themselves then persisted and developed a formal agreement for the management of the aquifer system.

## ***2.2 Negotiation Process***

Through the GEF project, Mali, Niger and Nigeria had worked together for several years to establish a joint database, Geographic Information System and hydrogeological model of the IAS. When the official GEF funding terminated in 2008, the countries determined that it was beneficial to continue to push forward and develop a Memorandum of Understanding

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<sup>8</sup> Id.

on their own.

Though international organizations played a pivotal role in initiating the science and research needed to understand the aquifer system, they played less of an overt role in facilitating the development of the Memorandum. A regional organisation, l'Observatoire du Sahara et du Sahel (OSS), based in Tunis, played a fundamental role in facilitating negotiations. Having developed a hydrogeological model for the North Western Sahara Aquifer System (SASS), the OSS was well-respected for its technical abilities, and was seen to be unbiased. It was also perceived to have insight into the 'West African context', which assisted negotiations and in building relations among states.<sup>9</sup>

Groundwater is curious resource and is often misconstrued by politicians or the public. Moreover, information about groundwater in the IAS region was not well understood prior to the development of the research project. As a consequence, negotiations between the countries were heavily reliant on technical and scientific input. As groundwater is not generally well known or understood, in order to reach agreements, discussions were based on scientific and technical information. This science-based approach was a focal point upon which the negotiating countries developed relationships. In the words of one senior government official, "the data base and model were instrumental in motivating the highest political levels to move towards formalising the informal mechanisms".<sup>10</sup> With the experience of working together through the GEF project, those involved in the drafting of the Memorandum shared similar understandings of the IAS. These technical experts then convinced their superiors of the need for an agreement between the countries.

Negotiations were not as politicized as technical experts, not politicians, made key decisions over information that was primarily technical and scientific in subject matter.

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<sup>9</sup> Chabo, J. (2008) Director of Nigeria Hydrological Service Agency, Ministry of Agriculture and Water. Personal communication 18 November, 2008

Issaka, I. (2008) Secrétaire Général, Ministère de l'Hydraulique, Niger. Personal communication 14 November

<sup>10</sup> Keïta, M. (2008) Senior Technical Council to the Minister, Ministère des Mines, de l'Energie et de l'Eau. Personal communication 21 November, 2008

Additionally, the ministers who adopted the treaty were not necessarily the key actors in the negotiation process.

Discussions and activities focussed on information and data exchange between the countries through the development of a transboundary diagnostic analysis and the subsequent creation of a joint database and hydrogeological model of the system.

The Memorandum of Understanding resulted from a solid understanding at the ministerial level in each of the countries that sustainable management of the water resources would require collaboration. Once political will was developed the negotiation process moved forward without financial support of international organisations. The adopted informal Memorandum of Understanding was therefore predicated on sound science and reflects the need for greater understanding of the resource, and continual adaptation to evolving situations.

### **3 Agreement**

The Memorandum seeks to promote integrated and sustainable management of IAS water resources through the establishment of a joint Consultative Mechanism. The intention behind the design of the Consultative Mechanism was to keep the body as operational as possible, in an effort to encourage greater awareness and efficiency.

#### **3.1 Governing Structure**

Under the MoU, the Consultative Mechanism (CM) is created to provide oversight and management for the sustainable, equitable and coordinated use of the water resources of the IAS. Article 3 of the MoU indicates that the principle objectives of the CM are to promote integrated management, cooperation, addresses risks, and sustainably develop the IAS resources. Interestingly, the CM is to manage and conduct activities to protect the water resources, in particular (but apparently not limited to) those activities that might have a transboundary impact(s).

The CM will formulate opinions on national activities and policies, develop integrated programs for management, promote harmonization of national legislation and policies, mobilize financial resources for CM designed activities and projects, and settle disputes, amongst others (See Section 3.4).

The CM will have a legal personality and authority to contract, acquire and dispose of property, seek and obtain loans, gifts, and technical assistance, and be a party in legal proceedings (see Art. 6). This is quite significant because it means that the three nations have delegated some of their sovereign rights and authorities to a supra-national entity to operate on their behalf. While the Council of Ministers (the most relevant minister in each country) also forms part of the CM, it is also comprised of technical committees, national scientific committees and an executive secretariat.

The Council of Ministers will oversee the functioning of the CM, and will make decisions regarding the programs developed by the executive secretariat and technical committees. The chair of the Council of Ministers rotates every two years, and the executive secretary is appointed by the Council of Ministers once every four years.

It is the executive secretariat which coordinates the technical committees (both national and supra-national) to identify the risks, review activities, develop policies, liaise with technical and financial partners, etc.

### **3.2 Flexibility**

As a step towards deeper cooperation, the text of the Memorandum allows for considerable flexibility. It requires parties to take into consideration equitable and reasonable water

use,<sup>11</sup> but does not discuss details of how equitable and reasonable use should be determined. In the 1997 UN Watercourses Convention equitable and reasonable are to be determined by taking into account a number of issues such as historical use, alternative sources, geography, social needs etc.<sup>12</sup> Here, the details are to be developed under technical and scientific bodies undertaking studies, though it is less clear as to how it should be determined. Flexibility in terms of the direction of cooperation is built into the Memorandum through the establishment of an Action Plan that is to be created through the Consultative Mechanism.<sup>13</sup> The agreement allows for flexibility in changes and amendments, which can be made by any party with respect to any new issue that arises. Unlike many agreements, which specify a time period for review, the Memorandum allows for alterations at any time. These changes, however, must have unanimous agreement by all parties.<sup>14</sup> This will become increasingly difficult to achieve if other countries who share parts of the IAS also join.

### ***3.3 Data and information Exchange***

Given that the entire programme of work associated with reaching an agreement on the management of the resources of the IAS was founded on data and information exchange, it is no surprise that parties to the Memorandum commit to exchange information in a variety of situations. Information exchanges are centred on scientific and technical information regarding the aquifer system, but information regarding its use may be included in future. The groundwater flow simulation, and its data input from the various countries, is a transparent way to warn about current water exploitation. Should over

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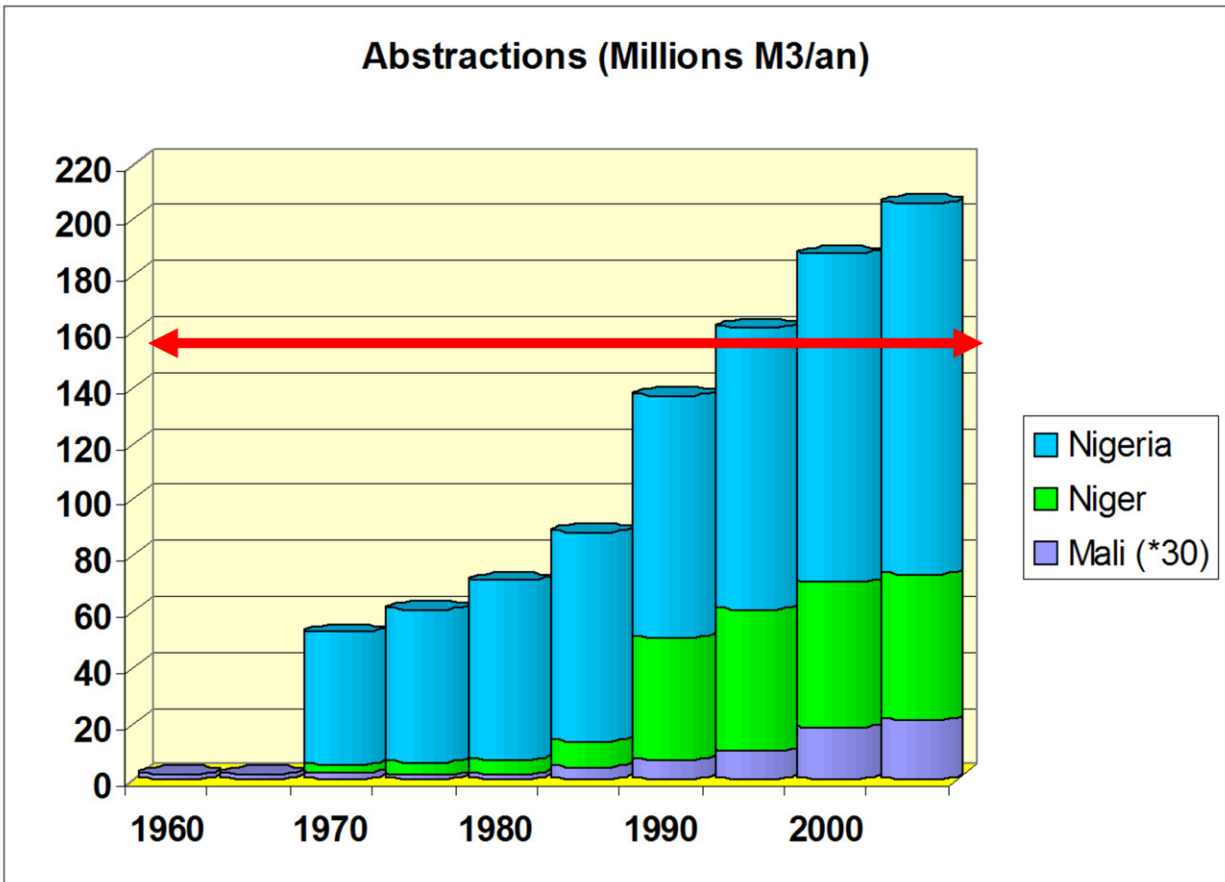
<sup>11</sup> Memorandum, art. 13

<sup>12</sup> Article 5 of The United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses, 21 May 1977, New York, 36ILM 700 (1997),.

<sup>13</sup> Memorandum, art. 5

<sup>14</sup> Memorandum, art. 43

exploitation be feared additional action will be required at the national level to address environmental and economic impacts, and will be approached under the Memorandum of Understanding.



The red line characterizes the groundwater recharge assessed by the IAS model. This means, since 1995, the groundwater is overexploited. Countries are very aware about it. The histogram characterises the water abstractions based on water uses (domestic, agriculture, livestock, mining). These type of data were given by the national experts (Mali, Niger and Nigeria) during the several training sessions organised in OSS headquarter.

The OSS has played a large role in encouraging information exchange in the area, which contributed to the success of negotiations. As a neutral third party to which states submit information, OSS encourages free data and information exchange, as well as joint information processing. OSS employs technical experts from all over Western Africa, and holds regional seminars that encourage participants to work together closely and transparently.

The creation of the Memorandum itself would likely not have been possible without the years of data and information exchange that the countries involved had experienced through the OSS. As a result, all three countries involved in the Memorandum shared the same level of understanding of the IAS and important issues regarding it. As they all share a similar knowledge base decisions focus on the different values regarding what knowledge gaps remain to be filled, and more importantly how water resources should be utilised, as opposed to what data is correct or what is to be believed.

However, information gathering regarding water use has not been the first priority in the area, and there is limited the quality and quantity of data obtained.<sup>15</sup> Nevertheless, it is hoped that the Memorandum will encourage continued attention at the national level to support information gathering as a basis for collective action, both at the national level and at the international level.

### ***3.4 Dispute Resolution***

To resolve disputes is one of the Consultative Mechanism's duties.<sup>16</sup> Informal means are the first step in any disputes regarding the Memorandum, and are to be settled through the Consultative Mechanism's offices, mediation or conciliation, or other peaceful

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<sup>15</sup> Before the "Managing Hydrogeological Risks..." project was launched, the last time estimates of groundwater reserves had been made in the area was in the 1970's (OSS, 2007). Analyse Diagnostique Transfrontalière du Système Aquifère d'Iullemeden. Observatoire du Sahara et du Sahel, Tunis, at 2, available at [http://iullemeden.iwlearn.org/publications/projectdocuments/SAI\\_Website.doc/view](http://iullemeden.iwlearn.org/publications/projectdocuments/SAI_Website.doc/view) , accessed 7 August 2010)

<sup>16</sup> Memorandum, art. 5

means.<sup>17</sup> However, if the issue remains unresolved, it is submitted to review by the National Scientific and Technical committees, who must propose a solution to the Council of Ministers within 3 months of receiving the issue.<sup>18</sup>

The Council of Ministers have decision making authority and must make decisions unanimously.<sup>19</sup> Discussions are based on reaching a consensus. If a unanimous decision cannot be made, the issue is taken to the Court of Justice and Human Rights of the African Union.<sup>20</sup> This linkage of the Memorandum to a higher body is not unique in international law, but is not common in many agreements related to transboundary water resources, and is novel in relation to groundwater resources in Africa. Though this feature has yet to be tested, it corresponds with the desire to keep the agreement as bureaucratically “light” as possible. It should also be noted that these countries are all members of the Niger Basin Authority, charged to oversee management of the Niger River, and thus have a track record of working together on transboundary water issues.

### ***3.5 Sustainable Financing***

The Memorandum adopts the “user - pays” principle as a sustainable financing mechanism for implementing the agreement. It also adopts the “polluter – pays” principle as a means of compensation for injured parties. The exact details of these mechanisms have yet to be determined, and it is not yet clear when and how this taxation will be established, and for whom. Presumably, this will also require appropriate national legislation to implement. Nevertheless, it demonstrates a recognition of the need to separate the operational costs of

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<sup>17</sup> Memorandum, art. 29

<sup>18</sup> Memorandum, art. 30

<sup>19</sup> Memorandum, art. 29

<sup>20</sup> Memorandum, art. 31

the programme from general national expenses and programmes. This is critical in countries where often departments are strapped for funding or dependent on central financing for their programmes.

Those involved in the creation of the Consultative Mechanism are mindful of the need for sustainable financing, and with that in mind they are seeking to devise a “light” bureaucracy that will be efficient and effective. As a legal entity, the Consultative Mechanism will be able to negotiate financing and loans, and has sought to receive funding from international organizations such as the African Development Bank, Africa Water Facility, UNEP, and GEF.

#### **4 Implementation and Monitoring**

The Memorandum was adopted by the three countries but has not yet been ratified at the national level; this is expected to be done in January or February 2011. This will also launch the second phase of IAS which is to extend to Taoudeni/Tanezrouft Aquifer System (Algeria, Benin, Burkina Faso, Mali, Mauritania, Niger and Nigeria) by Implementation and monitoring continue in the same fashion that was established under the original GEF project, with the OSS as the primary clearing house for data exchange and analysis.

#### **5 Third party intervention**

Throughout the development of the GEF project and the MoU, the OSS played a key and fundamental role in acting as an effective third party. As a primarily technical body, the organisation emphasised the importance of data and information exchange for the foundation of decision-making. As the project manager for the Transboundary Diagnostic Analysis and the development of the hydrogeological model, the OSS was a focal point for the technical bodies of the individual countries, none of whom individually had the capacity

or funding to administer the technical aspects of the project. The OSS therefore, assumed the role of a central clearing house for data and information, and was seen as a neutral third party in terms of deriving conclusions from the modelling.

Once the initial science had been completed the OSS facilitated dialogue, firstly between the national technical bodies and their relevant national ministries, and then subsequently between the parties at the ministerial level.

Possibly it was so effective in its role because its fundamental agenda was one of delivering scientific information. Also, there is merit in the fact that it was an African institution dealing with a regional issue.

## **6 Assessment and effectiveness**

The Memorandum represents a first phase towards deeper cooperation regarding the IAS. Those involved in its drafting in June 2009 also established a Road Map, and are working towards establishing “Phase Two”, the creation of a larger regional water agreement that links four of the IAS countries with the Niger River Basin Commission.<sup>21</sup>

As it is only in its earliest stages of ratification and implementation, it is still too early to definitively evaluate the costs and benefits of the agreement. The implementation, monitoring, and enforcement of the memorandum will be costly, as will the movement into “Phase Two” of integrated IAS management. Furthermore, it is unsure what the nature of management activities will be developed under the Action Plan. If limiting extraction is one of the objectives, as scientific knowledge would suggest, it is not clear how this will be achieved and who would pay for it. The hardest decisions have not yet been put forward,

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<sup>21</sup> Dodo, A. K. (2008) Regional Coordinator, IAS Project, OSS. Personal communication July 27, 2010

such as allocation and benefit sharing. Nevertheless, the creation of an agreement regarding groundwater recognizes its importance in the sustainable development and management of a transboundary resource. It recognizes the need to cooperate and collaborate in order to manage water sustainably. That those involved are looking to link groundwater to surface water in future phases represents greater understanding and awareness of sustainable water management in general.

A major benefit of the Memorandum has been its success in encouraging improved relations amongst the countries currently involved. The pattern left by colonization has not completely faded with time and there is a different culture of bureaucracy in Nigeria than in Mali and Niger. That said, the countries are relatively close in terms of trading and social interaction at the local level. Nigeria is the second largest trading partner for Niger after France. There are several bilateral agreements between them, such as the Niger-Nigeria Joint Commission to help define the boundary between the two countries. Moreover, the borders have divided local peoples between both Mali and Niger and Niger and Nigeria and there is active movement across the borders. Nevertheless, that these countries collaborated, created and reached an interim agreement on an issue as difficult to grasp as groundwater represents quite an achievement, given their historical detachment.

The Memorandum marks a first stage towards achieving sustainable use of water resources in the West African region. However, as the agreement itself is only in the early stages of acceptance by the countries involved, it remains to be seen whether it will indeed encourage sustainable management of the IAS.

Moreover, the Memorandum encourages general principles of sustainable water management, such as the polluter pays mechanism and a mechanism regarding prior

informed notification of use.<sup>22</sup>The inclusion of such principles, while only in general terms, insinuates a greater understanding of the parties to develop the resources in a neighbourly manner.

The Memorandum is not intended to be an agreement that will stand on its own. Rather, it is expected that the MoU will be eventually accompanied or superseded by a more comprehensive agreement that includes all of the countries that overly part of the IAS and addresses use of both ground and surface waters. Furthermore, there is the possibility to extend the process to adjoining countries of Algeria, Benin, Burkina Faso and Mauritania.

## 7 Conclusions

The Memorandum of Understanding relating to the creation of a Consultative Mechanism for the management of the Iullemeden Aquifer System is an ambitious and forward looking agreement in several areas. Notably, the MoU goes much farther, in terms of collaborative management of water resources, than do the two other international groundwater agreements in Africa, which deal primarily with data and information exchange. The MoU discusses the need for collaborative and joint management, and thus decision-making over a shared resource. While the concepts of sustainable management are vague, they are to be defined through scientific and technical bodies in the development of an action based management plan.

It is significant to note that entire tenor of the adopted MoU is one of collaboration, and it focuses more on balancing state sovereignty and state responsibility while avoiding direct

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<sup>22</sup> This is not the same as prior informed consent

reference to sovereignty in its formulation. This is particularly true with respect to the creation of the Consultative Mechanism (CM) as a supra-national body charged with dealing with the interests of all parties at an international and even somewhat national level. Also, significant is the level of technical positions involved in the CM which emphasizes the role of information and science in decision making.

The MoU is forward thinking both in terms of its linkage to surface water resources as well as maintaining a viable and long term funding for the Secretariat and its activities. The clear linkage with the surface water of the Niger River is a holistic approach to water resources. While it may complicate the tasks of the technical groups when developing management plans, it is helpful to advance overall sustainable management of water in the region. Caution should be applied however, as the potential expansion of the MoU's scope to link it to surface water will need to be carefully thought out so as not to encumber management decisions of the three member states relating to groundwater with the complexities of dealing with the nine member states of the Niger Basin Authority. This is also true when considering the geographic expansion of the MoU to include Algeria and Benin. While inclusiveness is laudable, the portion of the Iullemeden Aquifer System in each country is very small in comparison to the three member countries and there are efficiencies in keeping management authorities small and focussed. If new members are to have similar standing to the three current members, then coming to unanimous decisions will either become increasingly difficult, or decisions may become increasingly inconsequential to allow all to agree. Careful consideration will therefore be needed when including the indirect incorporation of surface water issues or additional membership.

Funding for the secretariat and its activities of planning and implementation are to be secured through water taxes in each of the countries. Details are not given and presumably each country will determine how best to approach that issue based on their constitution and existing legislation. In terms of amounts, there are thoughts for countries to pay the appropriate contribution to the common budget similar those of the Niger Basin Authority. There are obvious complexities in terms of how this may be implemented. Not only will

additional costs for a resource be unpopular, but many of the thousands of wells are privately owned, making monitoring and enforcement very difficult. There could easily be problems with implementation of a national policy that is directed to only certain regions of a nation. There could also be problems determining which body will collect and administer revenues. Furthermore, jurisdictional issues related to control of water may arise. In many countries water is under the jurisdiction of provincial or state authorities as opposed to the central government. Despite the shortcoming in its implementation, the foresight in perceiving the need for a sustainable financial mechanism is commendable. Moreover, implementing a cost associated with groundwater extraction may help reduce the over subscription of the resource which is depleting the resource.

The concept of polluter pays is also important in addressing the sense of equitable responsibility over the resource. Pollution is particularly pernicious with groundwater resources where contaminants may reside for long periods of time potentially rendering water sources unusable for decades. How compensation would actually be estimated and provided is a difficult question. The fact that there is the potential for penalties and compensation is important. States will not be able to externalise the impact of their actions.

One of the cornerstones of the development of the MoU was the sharing and exchange of data and information as a basis for developing a common understanding and thus common decision-making. This remains central in the development and implementation of the management plans, where national scientific and technical committees will provide the bulk of recommendations regarding management and policy. Such a scientific-based approach is important to keep all parties on a same level playing field with respect to knowledge and understanding. Moreover, the collaboration between the technical experts between the signatory country helps to deepen the collective approach to resource utilisation, and thus a more equitable allocation of the resource.

Decision-making by the council of ministers suggests that they will be approving management plans as opposed to determining the details of those plans, despite the fact that the MoU suggests they will draft plans. Unanimity is also important as it promotes a more collaborative approach. While it can have the effect of limiting decision-making, the dispute resolution mechanism appears well thought out in that it ultimately depends upon an external mechanism. This appears to promote agreement and compromise at the ministerial level, as few countries would wish to have external arbitrators determine water management issues for them. This is related to another interesting observation: the use of the OSS as a neutral member to collect information and analyse it for all members appears to reduce the sense of non-compliance between member states to the MoU. The use of the OSS as a technical broker of information is similar to the use of the International Joint Commission in the development of the Columbia River Treaty. The difference is that the OSS will continue to serve as that neutral party during implementation, whereas most neutral parties are not influential beyond the development of the agreement. It will be interesting to see how this approach unfolds in the coming years.

The open flexibility in the agreement is also important and somewhat unusual. Most agreements provide for review at some stage. However, few allow for any changes at any time based on agreement by other parties. This is similar to the Colorado and Rio Grande (Rio Bravo) model where significant decisions can to be made by the International Boundary and Water Commission through the creation of Minutes, which have legal standing.

While the Memorandum of Understanding appears to demonstrate a unique and innovative approach to the sustainable management of transboundary groundwater resources it will be interesting to see how implementation is conducted and supported by the member states.